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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/977,540	10/15/2001	Vahid Tarokh	7000-103	3519
27820	7590	07/20/2005	EXAMINER	
WITHROW & TERRANOVA, P.L.L.C.			JUNG, MIN	
P.O. BOX 1287			ART UNIT	
CARY, NC 27512			PAPER NUMBER	
			2663	

DATE MAILED: 07/20/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

09/977,540

Applicant(s)

TAROKH ET AL.

Examiner

Min Jung

Art Unit

2663

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 15 October 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-28 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-28 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 15 October 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 112***

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. Claims 6, 12, 16, 20, 24, and 28 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. The specification fails to provide a meaningful teaching to make the system comprising receiver circuitry for receiving signals modulated using a technique other than OFDM. Instead, the specification at page 16, paragraph 0055 describes that other methods have been studied, but they are found to be difficult to be implemented.

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claim 28 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 28, it seems that the dependency of the claim is in error. "21" should be changed to "25".

***Claim Rejections - 35 USC § 102***

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

6. Claims 1-3, 7-9, 13-15, 17-19, 21-23, and 25-27 are rejected under 35 U.S.C. 102(e) as being anticipated by Mody et al., US Pat. Publication No. 2002/0181390 (Mody).

Mody discloses a wireless Orthogonal Frequency Division Multiplexing (OFDM) communication system having a base station. See Abstract and page 2, paragraph 0026.

Specifically regarding claims 1, 7, and 13, Mody teaches a quadrature modulator adapted to generate symbols from data to be transmitted (symbol mapper 28, page 3, paragraph 0035, Mody teaches quadrature modulation by teaching the symbol alphabets generated according to QPSK system at page 4, paragraph 0042) ; a symbol encoder adapted to encode the symbols based on space and time wherein constellation position and timing of the symbols are affected to provide a plurality of series of encoded symbols (space-time processor 30, page 3, paragraph 0036); transform circuitry adapted to provide a type of inverse Fourier Transform (IFT) on each of the plurality of series of encoded symbols to provide a series of IFT symbols (IDFT 38, page

Art Unit: 2663

4, paragraphs 0045 and 0046); and a plurality of transmission path, each of which being coupled to one of a plurality of antennas and adapted to modulate one of the series of IFT symbols for transmission from one of the plurality of antennas to provide spatial diversity (the plurality of transmission path shown by a plurality of OFDM modulators 16 in Fig. 1, page 2, paragraph 0028).

Regarding claims 2, 8, and 14, Mody further teaches cyclic extension circuitry in each of the plurality of transmission paths and adapted to receive and add cyclic extensions to the IFT symbols prior to modulation and transmission (cyclic prefix inserter 40, page 4, paragraph 0047).

Regarding claim 3, 9, and 15, Mody further teaches data encoding circuitry adapted to receive and process the data to be transmitted prior to modulation by the quadrature modulator to facilitate error correction or detection by a receiver of the transmitted data (channel encoder 26, page 3, paragraph 0034).

Regarding claims 17-19, 21-23, 25-27, Mody teaches the receiving end as shown in Figs. 7 and 8. Specifically, Mody teaches a plurality of antennas (antennas 20), a plurality of receiving path (a plurality of OFDM demodulators 22), transform circuitry (DFT 64), interference cancellation circuitry (parameter estimator 112 working with other components in the loop, page 7, paragraphs 0076 and 0077), a symbol decoder (space-time processor 110), a quadrature demodulator (symbol demapper 116), cyclic extension circuitry (cyclic prefix remover 62), and a data decoding circuitry (channel decoder 118).

***Claim Rejections - 35 USC § 103***

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 4, 5, 10, 11, rejected under 35 U.S.C. 103(a) as being unpatentable over Mody in view of Li et al., US Pat. Publication No. 2003/0169681 (Li).

Regarding claims 4, and 10, Mody as described above fails to teach that the frequency reuse factor with respect to the base station and the at least one additional base station is approximately one. However, Li teaches the concept of making the frequency reuse factor one between two cells (between two base stations). See Fig. 8 and page 7, paragraph 0104. The frequency reuse pattern shown in Fig. 8 represents an ideal frequency reuse pattern which can be adopted by any cellular system when interference component is taken care of using one method or another. Therefore, it would have been obvious for one of ordinary skill in the art at the time of the invention to implement the Mody's system by specifically adopting the teaching of Li to make the frequency reuse factor to be one since that represents the most ideal situation in frequency efficiency in cellular systems.

Regarding claims 5 and 11, Mody further teaches that the wireless communication system may be a wireless local area network, in which the base stations being synchronized to a common clock signal is inherent.

Art Unit: 2663

9. Claims 6, 12, 16, 20, 24, and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mody in view of Alamouti et al., US Pat. No. 6,853,629 (Alamouti).

Regarding claims 6, 12, 16, 20, 24, and 28, Mody as described above fails to teach receiver circuitry for receiving signals modulated using a technique other than OFDM. Alamouti teaches communication method combining a form of time division duplex, frequency division duplex, TDMA, OFDM, spatial diversity, and polarization diversity in various combinations, thus requiring a receiver to handle signals modulated using a technique other than OFDM. Therefore, it would have been obvious for one of ordinary skill in the art at the time of the invention to design a receiver circuitry in Mody for receiving signals modulated using a technique other than OFDM in addition to processing OFDM signals.

### ***Conclusion***

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The Ma et al. Pub., the Walton et al. patent, the Wu et al. patent, the Ling et al. patent, the Vook et al. Patent, the Kuchi et al. Patent, the Nangia et al. Pub., and the Shalvi et al. patent are cited for further references.


11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Min Jung whose telephone number is 571-272-3127. The examiner can normally be reached on Monday, Thursday, Friday 7:30 - 6:00.

Art Unit: 2663

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ricky Ngo can be reached on 571-272-3139. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

MJ  
July 15, 2005

  
Min Jung  
Primary Examiner